Cruise Report

R/V CAPE HENLOPEN

15-20 May 1978

David Twichell, USGS
Woods Hole, MA 02543

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Vessel: R/V CAPE HENLOPEN, Captain John W. Gay III

Area Outer Continental Shelf south of New England between Block and Atlantis Canyons

Ports : Atlantic City, N.J. - Atlantic City, N.J.

Date 15-20 May 1978

Personnel:

U.S.G.S. (scientists)	D. Twichell	(Chief Scientist)
	B. Irwin	
Univ. of Delaware (students)	D. Bebel	
	T. Crosby	
	K. Kent	
	G. Snyder	
	M. Swincki	
Offshore Navigation, Inc. (technicians)	M. Coster	
	J. Barnard	
Huntec (technician)	D. Tullet	
U.S. Navy (engineer)	N. Fuller	

Navigation: Loran C - Teledyne and Simrad receivers

Scientific Equipment: Klein side-scan sonar

Huntec subbottom profiler (1500-7000 Hz bandpass)

EØD Western 60 kHz echo sounder

Narrative: (using eastern daylight time)

15 May 1978	1415	Depart Atlantic City, N.J.
16 May 1978	0115	Start deploying side-scan and Huntec fish
	0224	Begin Line #1 of the survey
	1125	Side-scan winch broke and fish crashed into the bottom
	1151	Winch repaired and side-scan fish aboard, but not working--continue line #1 with Huntec alone
	1945	End Line #1
	2030	Begin Line #2

17 May 1978	0015	Side-scan working
	0130	Side-scan broken again (shorted due to leak in connection)
	0200	End Line #2 - Begin Line #3
	0430	End Line #3 - Begin Line #4
		End Line #4
		Begin Line #5
		End Line #5 - Begin Line #6
	1145	Side-scan back in water and working
		End Line #6 - Begin Line #7
		End Line #7 - Begin Line #8
		End Line #8 - Begin Line #9
18 May 1978	0156	End Line #9 - Begin Line #10
	0745	End Line #10 - Begin Line #11
		End Line #11 - check equipment
		Begin Line #12
		End Line #12 - Begin Line #13
		End Line #13 - Begin Line #14
19 May 1978	0200	End Line #14 - Begin Line #15
		End Line #15 - Begin Line #16
		Change speed from 5.5 to 4.5 knots
		End Line #16 - Begin Line #17
		End Line #17 - Begin Line #18
		End Line #18 - Begin Line #19
		End Line #19 - Begin Line #20
		End Line #20 - Begin Line #21
		End Line #21 - End survey - pull equipment aboard
20 May 1978	0005	All equipment aboard and secured - steaming for Atlantic City, N.J.
	0850	Docked at Atlantic City, N.J

Operational Summary
R/V CAPE HENLOPEN
15-20 May 1978

Latitude and Longitude and Loran C fixes for deployment of gear and end points of the lines

		N	W	NAN	DANA
	16 May				
Deploy Gear	0146	39°54'	71°51.6'	50462.2	70209.5
Begin Line 1	0215	39°56.6'	71°48.2'	50416.5	70201.1
Side-Scan Aboard	1300	40°19.6'	70°50.2'	49837.2	70174.2
End Line 1	1945	40°40.4'	70°00.5'	49372.9	70145.1
Begin Line 2	2030	40°39'	70°02.2'	49393.7	70148.6
	17 May				
Deploy Side-Scan	0015	40°13.2'	70°04.8'	49670.0	70263.4
Side-Scan Aboard	0130	40°05.2'	70°04.7'	49754.7	70300.7
End Line 2 Begin 3	0215	40°01.6'	70°05'	49796.7	70316.8
End Line 3 Begin 4	0430	40°11.7'	70°22.8'	49767.2	70251.7
End Line 4	0715	40°16.8'	70°47'	49843.9	70192.3
Begin Line 5	0802	40°16.5'	70°47'	49847.4	70193.1
End Line 5 Begin 6	1030	40°30.7'	71°01.2'	49804.0	70104.1
Deploy Side-Scan	1145	40°26.5'	71°12.1'	49913.3	70108.6
End Line 6 Begin 7	1345	40°19.8'	71°28'	50078.0	70116.1
End Line 7 Begin 8	1645	40°27.4'	71°49.1'	50162.0	70043.3
End Line 8 Begin 9	1842	40°38.4'	71°44'	50039.0	69997.0
	18 May				
End Line 9 Begin 10	0158	40°46.2'	70°50.1'	49597.1	70047.2
End Line 10 Begin 11	0745	40°22'	70°27.3'	49684.4	70193.5
End Line 11	1145	40°44.2'	70°17.2'	49407.4	70103.8
Begin Line 12	1330	40°43.1'	70°16.9'	49417.1	70110.0
End Line 12 Begin 13	1700	40°30.6'	69°58.4'	49468.7	70191.6
End Line 13 Begin 14	2240	40°03.8'	70°23.8'	49850.2	70283.2
	19 May				
End Line 14 Begin 15	0200	40°20.4'	70°32.5'	49724.7	70193.7
End Line 15 Begin 16	0545	40°4.5'	70°51.5'	49989.2	70244.1
End Line 16 Begin 17	0900	40°16.2'	70°58.3'	49917.3	70178.6
End Line 17 Begin 18	1330	40°24.4'	71°16.5'	49960.0	70112.3
End Line 18 Begin 19	1530	40°33.5'	71°24.5'	49940.6	70054.5
End Line 19 Begin 20	1830	40°19.5'	71°30.5'	50098.4	70114.4
End Line 20 Begin 21	2215	40°04.1'	71°47'	50342.8	70164.3
End Line 21 Pull Gear	2330	40°07.8'	71°53.5'	50354.0	70134.9

Table 1

Total Time of Cruise	112 hrs. 11 min
Total Distance of Cruise	1,407 km
Total Time Spend Surveying	93 hrs. 6 min
Total Distance Surveyed	941 km

Table 2

Total Distance Run with Gear Streamed

	km	Huntec (Vr. boom 1.5-7 KHz)	Side-Scan	Echo Sounding (60 KHz)
	0	0	0	0
	218	218	92	218
	281	281	139	281
	231	231	231	231
19/5	211	211	211	211
	0	0	0	0
Totals	941	941	673	941

Discussion

The Continental Shelf between Block Channel and south of Nantucket Island, Massachusetts is anomalous for the eastern United States as the topography is exceptionally smooth and silt and clay comprise 20 to 95% of the surface sediments. This "mud patch" is about 100 km by 200 km and is elongate in the east-west direc-

The objectives of the CAPE HENLOPEN cruise were to map the surface charac-

thickness, and extent of this lens of fine sediment to define the origin and present processes responsible for the development of this anomalous sediment deposit

A high-resolution subbottom profiling and side-scan sonar survey of the mud patch was undertaken. A Huntec deep towed "Boomer" (1500-7000 Hz bandpass) was used for the subbottom profiling, and a Klein side-scan sonar (103 kHz) was used which scanned 100 m to each side of the towed fish. The Huntec subbottom profiler ran continuously while the side-scan was broken for about 1/4 of the survey time.

The high-resolution seismic reflection profiles showed a lens-shaped deposit up to 12 m thick whose boundary corresponds with the fine textured sediments on the surface. Sediments are thickest near the eastern margin of the lens suggesting an eastern source. However, highest concentrations of fines in the surface sediments lie in the center of the lens. Underlying the lens is an undulating reflection surface similar to the ridge and swale topography seen on the adjacent sandy shelf to the west

Side-scan sonar revealed that the surface of the mud patch is smooth, interrupted occasionally by trawl marks that are more common along its sandy seaward edge. Along the shoreward edge of the mud patch some small areas contain more reflective sea floor with 1-2 m spaced megaripples with east-west oriented crestlines.

R/V CAPE HENLOPEN TRACK LINE
MUD PATH SURVEY